

# Appliances, Equipment, and Consumer Electronics: Opportunities Ahead

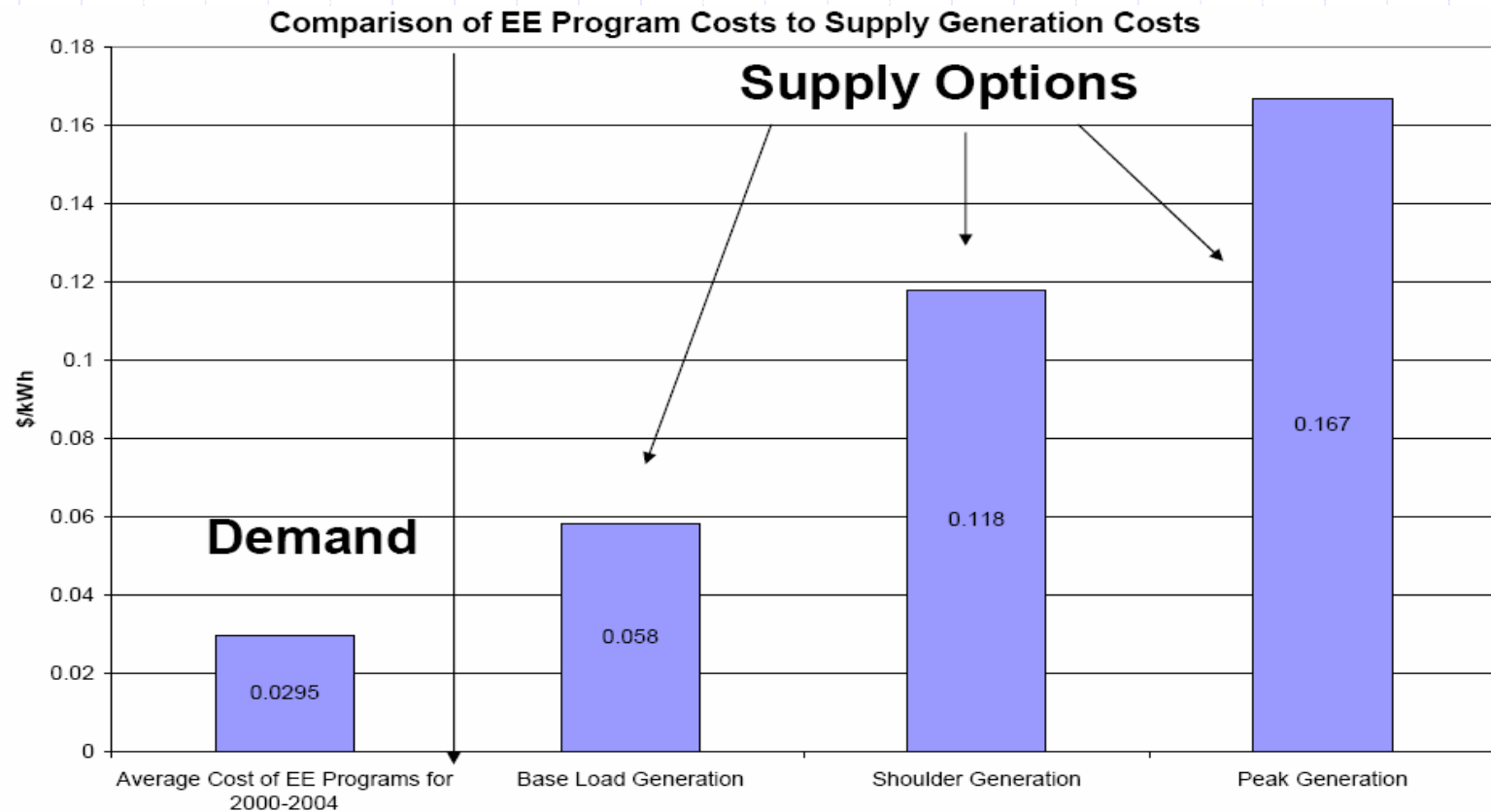
Climate Action Team  
Technology Symposium  
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# Energy Efficiency...Who Cares?

- ◆ **Cheap** – first on the CA loading order
- ◆ Reliable & non-volatile (no fuel price risk)
- ◆ No associated extraction or T & D losses
- ◆ Increases effective grid capacity
- ◆ Self-perpetuating – Appliance efficiency innovations often persistent in market
- ◆ Clean & climate friendly -- Low carbon / low emissions
- ◆ Growing marketing relevance
- ◆ Favors “distributed” R&D and innovation across markets
- ◆ \$ Billions of public funds to be spent on EE in CA in the next decade – similar to the CSI funding

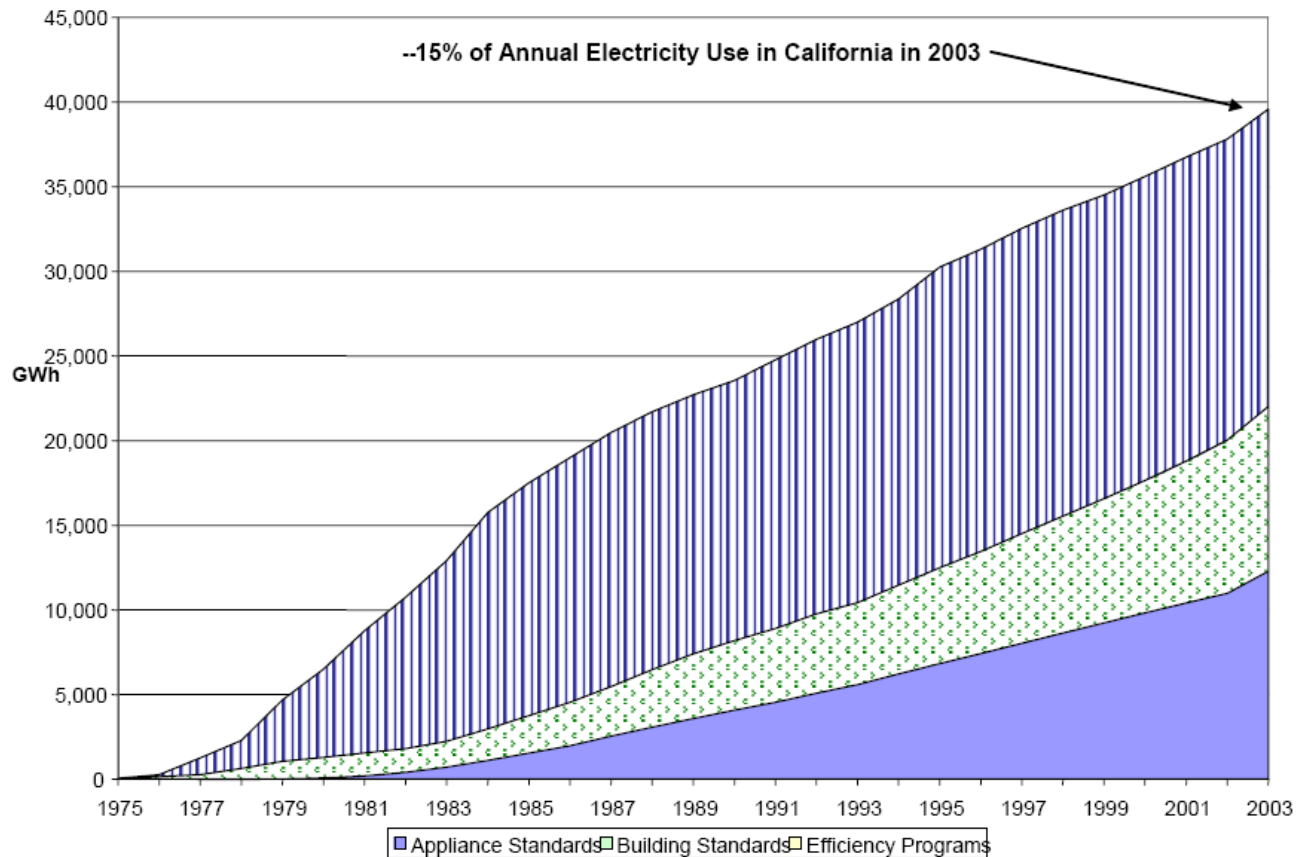
# Really... First in the Loading Order!



# The Appliance Opportunity: A Lower Bound

- ◆ Federal appliance and Equipment standards enacted in 1987 through 2001 have already cut electricity use by over 3% and when fully implemented, 8% of projected electricity use in 2020 (4 quads primary) [ACEEE 2001]
- ◆ ==> 75 MMT of carbon reductions ~ 50 million 1997 passenger cars [ACEEE 2001]
- ◆ Standards for 13 new appliances could save another 1.8 quads and 34 MMT of carbon by 2020 (many of these were adopted in EAct 2005) [ACEEE 2001]
- ◆ **Standards are just the lower bound, much more is available**

# A California Perspective

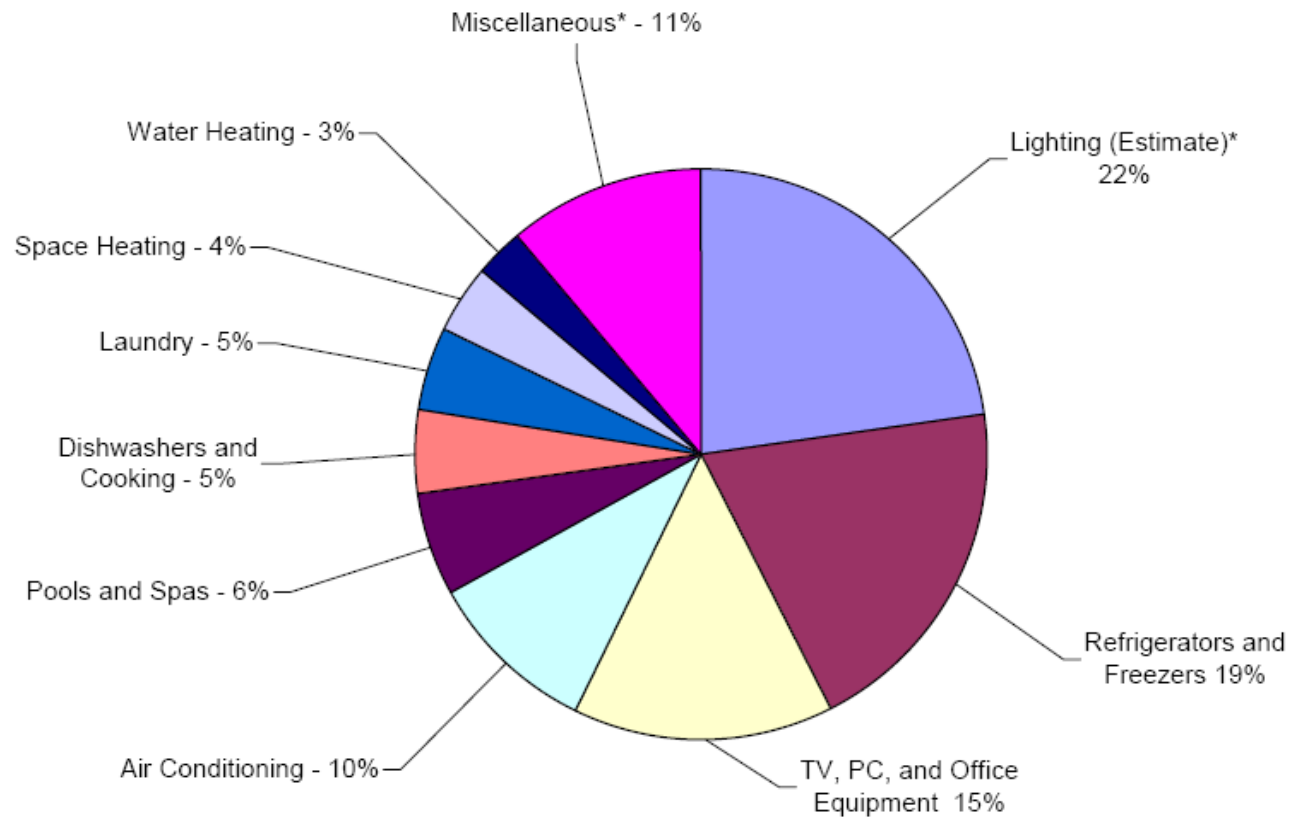


Source: Energy Commission DSM forecast model output

# Residential Use (~1/3 of CA Electricity)

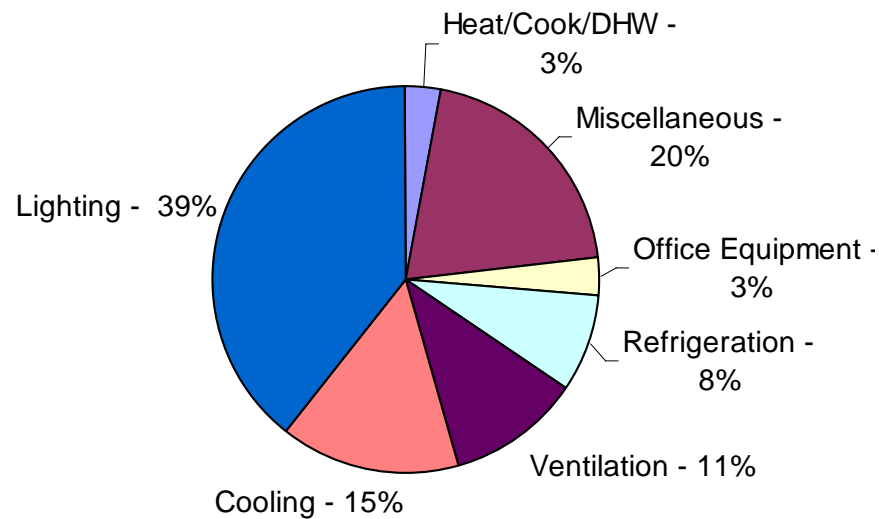
[RASS 2003]

**Statewide Electricity Use per Household**  
**5,914 kWh per Household**



# Commercial Use (~1/3 of CA electricity) [CEC 2001]

## Commercial Energy End-Use Breakdown, 2000



# Remaining Savings Potential

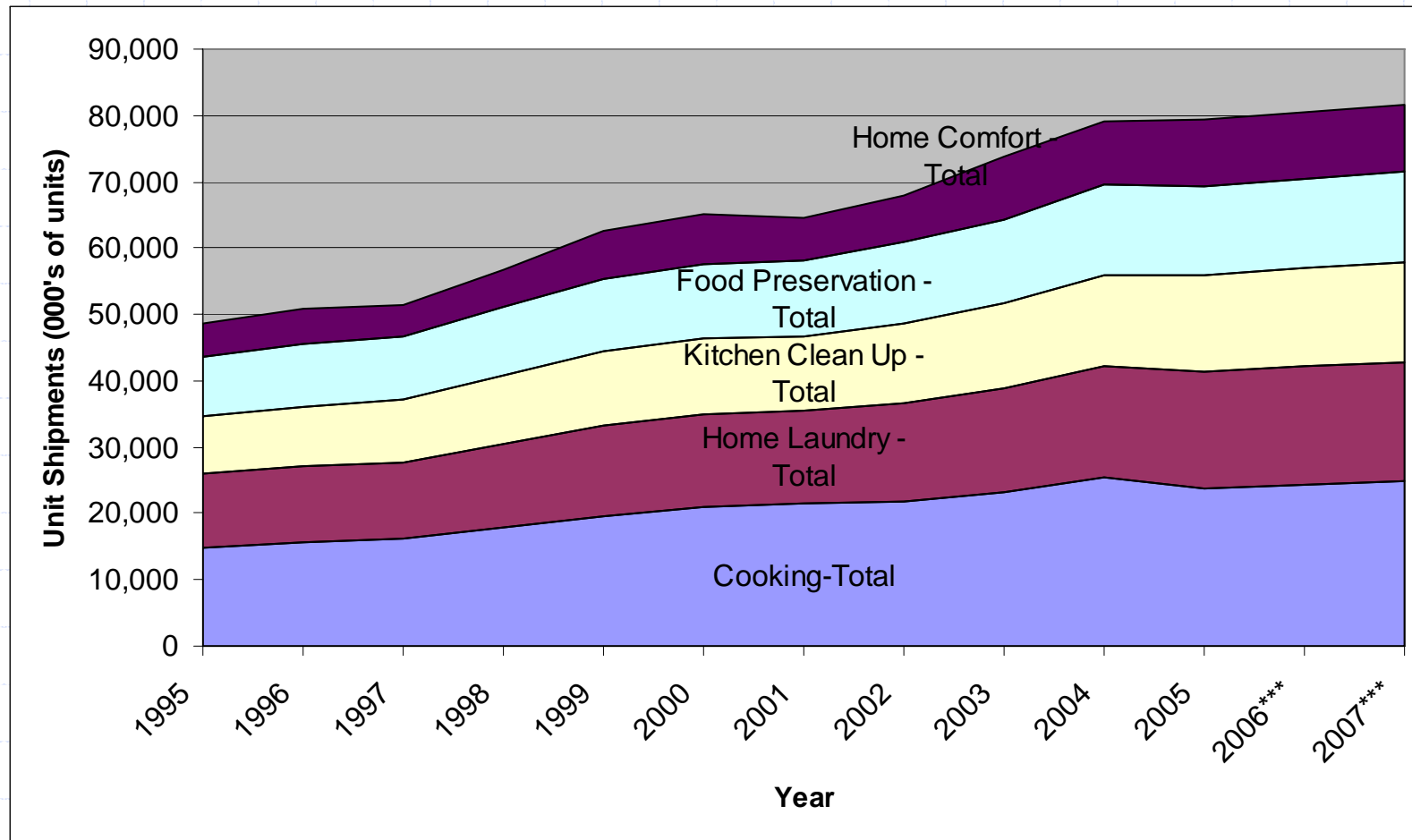
- ◆ CA IOU energy efficiency savings goals 2004-2013 = 23,000 cumulative GWh/year (~7%) ~10 MMT CO<sub>2</sub>/yr
- ◆ Xenergy 2003 *California's Secret Energy Surplus* Study estimates that 40,000 GWh/yr (13% of baseline use) is economically achievable by 2011 (<\$0.085/kWh)
- ◆ A large chunk of this is attributable to appliance, equipment, and electronics
  - Potential savings vary greatly by product, but generally, baselines seriously lag maximum existing technology
  - With respect to consumer electronics, average energy use/unit could be cut in half with current technologies.



# But Wait, There's More...

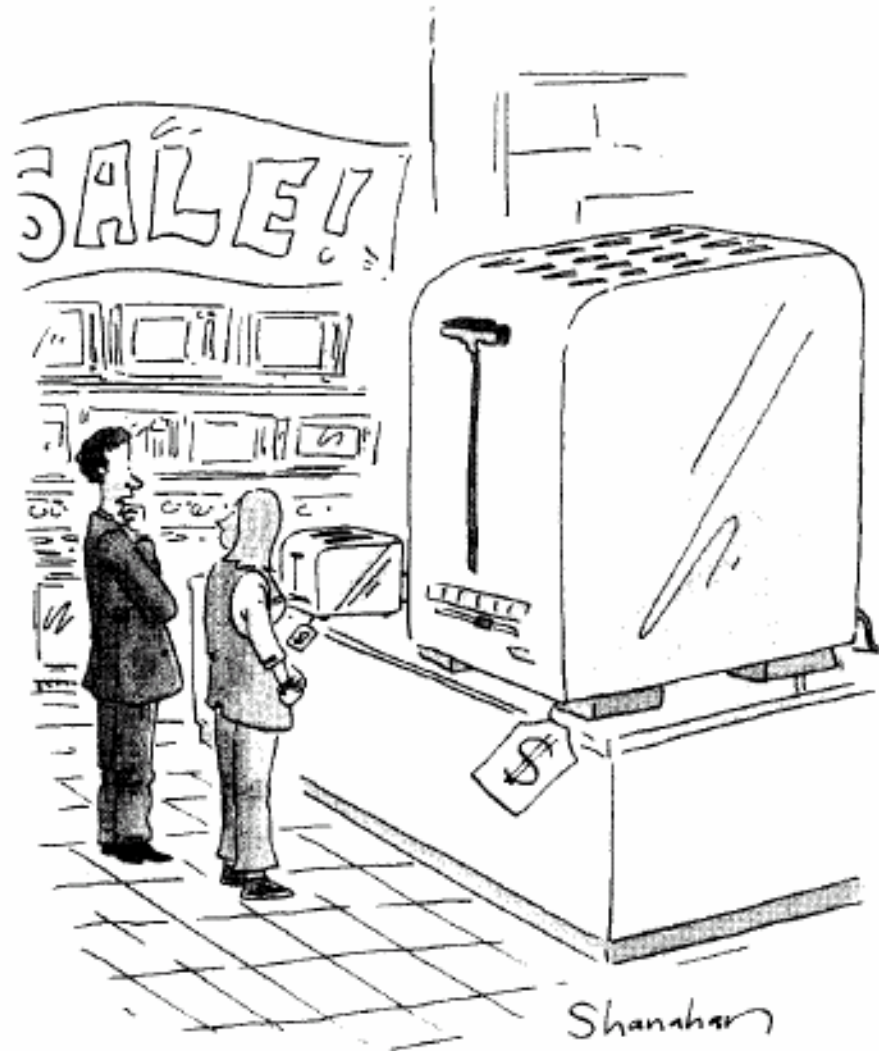
- ◆ Population growth and increasing wealth and home square footage has led to increasing stock and market saturation of appliances & equipment

# AHAM's US Appliance Shipments: ~5% Annual Avg. Increase!



# But Wait, There's Even More...

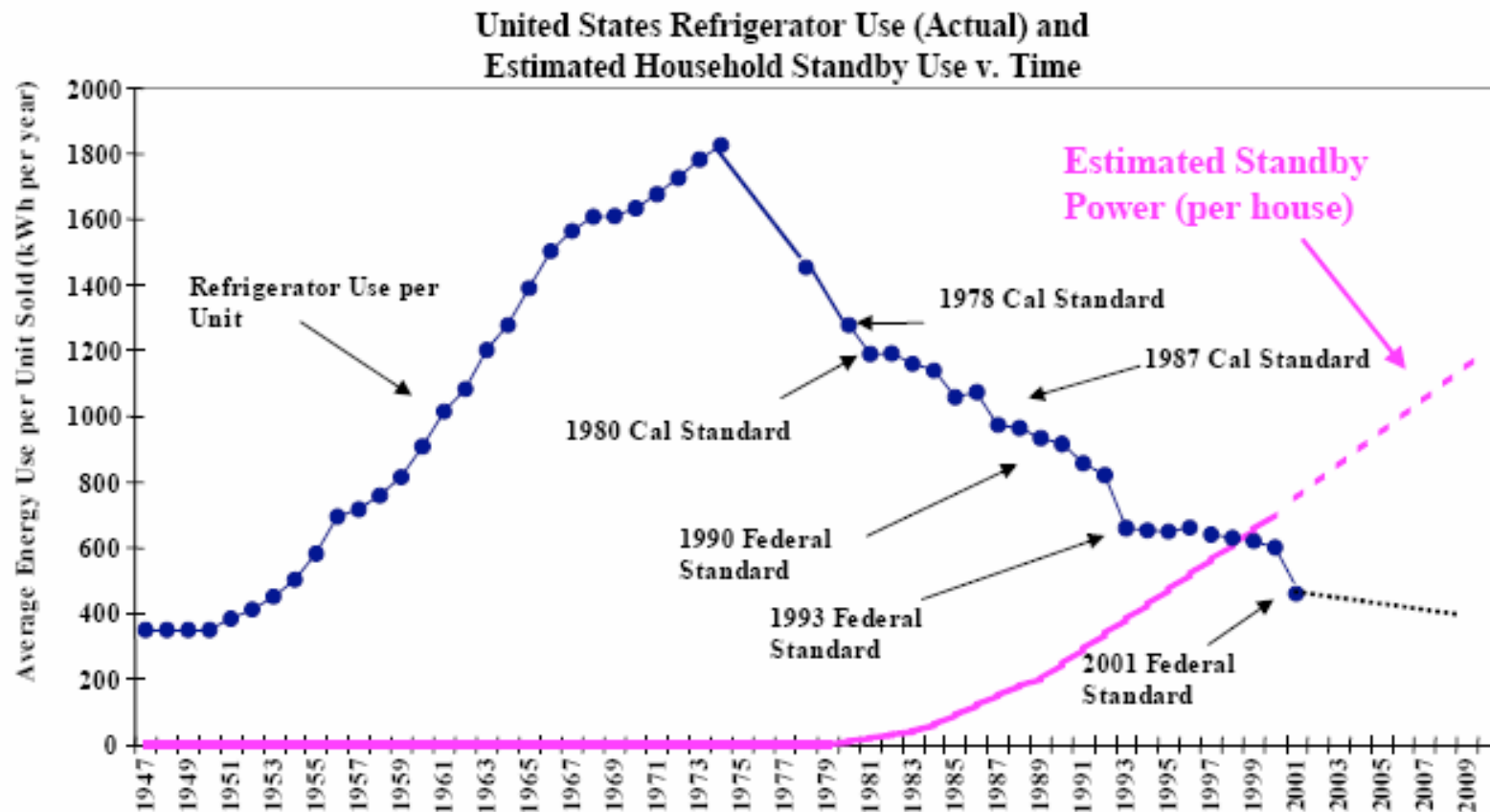
- ◆ In appliances, equipment and electronics energy intensity is generally decreasing within the context of specific functionality, but “per unit functionality” is growing faster
- ◆ Electronics is both rapidly increasing in market penetration and in it's per unit functionality (e.g., late 1980's 386 chip versus current desktop CPUs)



"I suppose I could live with two slices at a time." 3

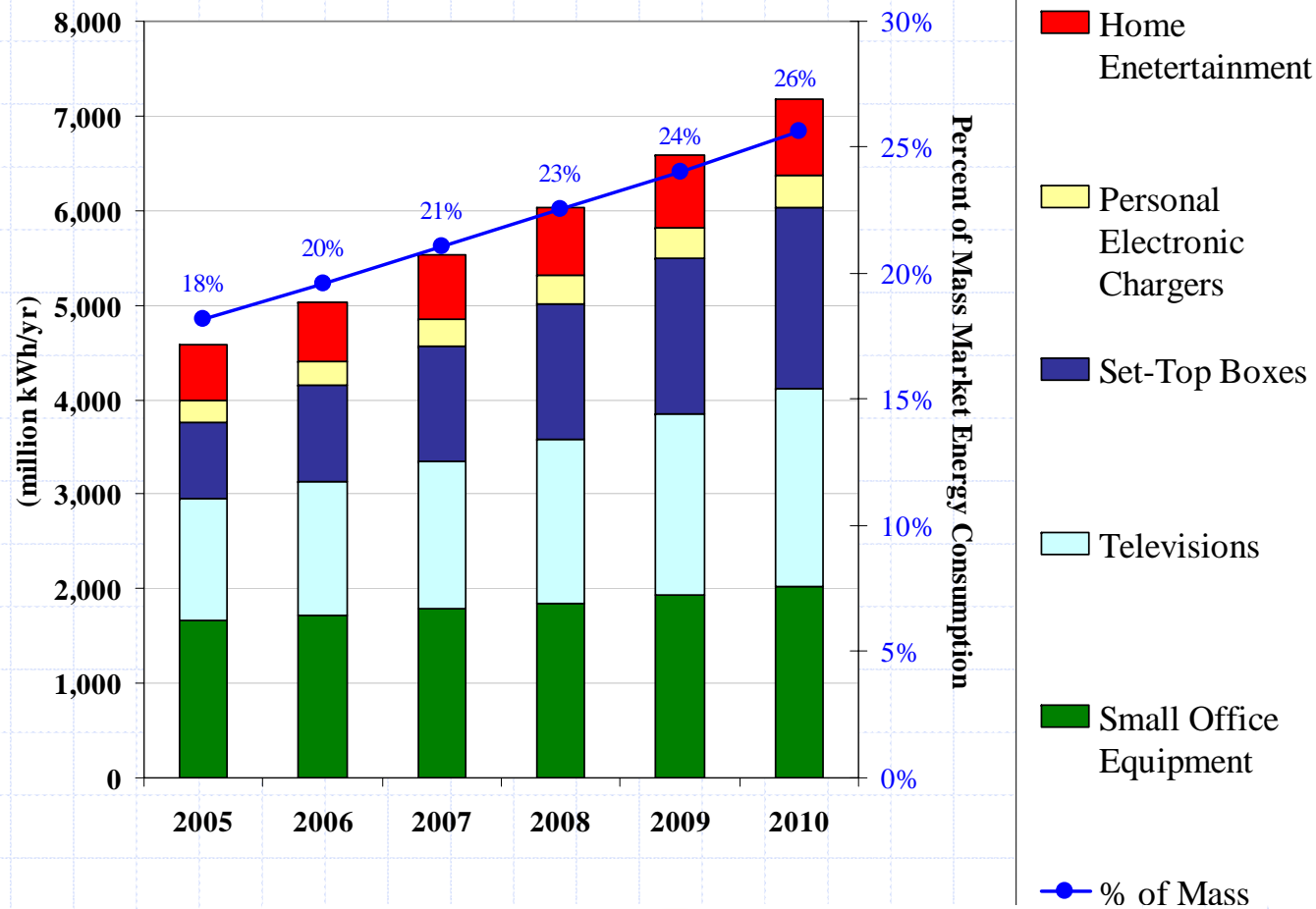
# Electronics: Trouble Ahead...

## HH "Phantom Loads" Exceed RFs!



# PG&E Consumer Electronics Energy Forecast 2005-2010

[PG&E 2006]



# Climate Policy Strategies

- ◆ Policy should enhance support for:
  - Utility programs
  - Education/Labeling programs (Energy Star, etc.)
  - Appliance & building standards
  - Internalize externalities (increase avoided costs)
  - CO2 Cap and trade – double the value of energy efficiency?

# Business Opportunities

- ◆ The products discussed represent over \$200 Billion in annual shipments (AHAM, ARI, CEA)
- ◆ \$ Billions in public funds for rebates from CA IOUs over the decade
- ◆ Closely track/participate in standards and voluntary program development, globally
- ◆ Look across product categories to find markets for your solutions or solutions for your market
- ◆ Elevate efficiency in your design process where ever you can afford it
- ◆ Know your products' energy performance and market it where it may add value
- ◆ Don't overlook opportunities for early retirement, procurement specs, and "niche" markets



# Thank You!

Questions?

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E N E R G Y  O L U T I O N S

# Extra Slides

# Appliances, Equipment and Consumer Electronics

- ◆ Category loosely defined to include:
  - Devices normally called appliance (e.g. "white goods")
  - HVAC and water heating equipment
  - Residential pool pumps, spas, etc.
  - Refrigeration and food service equipment
  - Plug-in consumer electronics
  - Lighting

# IOU Savings Goals 2004-2013

**Table E-1. Electricity and Natural Gas Program Savings Goals  
(All Investor-Owned Utilities)**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Annual Electricity Savings (GWh/yr)	1,838	1,838	2,032	2,275	2,505	2,538	2,465	2,513	2,547	2,631
Total Cumulative Savings(GWh/yr)	1,838	3,677	5,709	7,984	10,489	13,027	15,492	18,005	20,552	23,183
Total Peak Savings (MW)	379	757	1,199	1,677	2,205	2,740	3,259	3,789	4,328	4,885
Total Annual Natural Gas Savings (MMTh/yr)	21	21	30	37	44	52	54	57	61	67
Total Cumulative Natural Gas Savings (MMTh/yr)	21	42	72	110	154	206	260	316	377	444

Source: CPUC Decision 04-09-060, September 23, 2004, *Interim Opinion: Energy Savings goals for Program Year 2006 and Beyond*.

Product Category Technology / Device	2005 PG&E Mass Market Stock (000)	Units per PG&E household	Baseline Annual Energy Consumption (million kWh/yr)		
			2005	2010	% Change
Televisions					
CRT	8,820	2.0	1,115	1,237	11%
LCD	520	0.1	56	348	517%
Plasma	190	0.0	53	287	437%
Projection	270	0.1	64	227	256%
subtotal	9,800	2.2	1,290	2,100	63%
Set-Top Boxes					
Digital cable box	2,100	0.5	334	616	84%
Digital satellite receiver	1,890	0.4	235	481	104%
Digital video recorders	930	0.2	246	736	199%
IPTV	40	0.0	5	81	1653%
subtotal	4,960	1.1	820	1,910	133%
Home Entertainment Systems					
DVDs	4,150	0.9	140	215	54%
Home theaters	900	0.2	104	167	61%
Component Stereo	1,600	0.4	212	243	14%
Compact Stereo	1,250	0.3	94	149	57%
Portable Stereo	1,600	0.4	30	38	28%
subtotal	9,500	2.2	580	810	40%